

REMARKS/ARGUMENTS

This Amendment is in the newly approved Revised Format such that each section of this Amendment begins on a separate sheet.

It is noted that Claims 1-14 were previously cancelled. By the foregoing amendments, Claim 19 has been cancelled and its subject matter added to independent Claim 15, which has also been further amended to more particularly point out the novel features of the present invention. Claims 16, 17 and 18 have been amended by the foregoing amendments to conform their language to that of amended independent Claim 15 and to include "The" as the leading article. New Claims 20 and 21 have been added to recapture the subject matter deleted from amended Claim 15 relating to the nature of the hydrogen-containing gas stream. New Claims 22 and 23 have been added to further clarify the scope of the present invention and are supported by the disclosures provided at page 7 (second and third paragraphs) and pages 1 (fourth paragraph) and 5 (second paragraph) of the present specification, respectively. In the foregoing circumstances, it is believed that none of the foregoing amendments introduces any new matter into the present application.

Claim Rejections Under 35 U.S.C. § 103(a)

On pages 4-6 of the Office Action, the Examiner has rejected Claims 15-19 under 35 U.S.C. § 103(a) as being unpatentable over "Hydrogen-Fueled Flares", alone, or in view of Vickery (US Patent No. 5,061,463) or Milfeld et al. (US Patent No. 5,366,699). Applicant respectfully traverses these rejections for the following reasons.

As recited in amended independent Claim 15, the present invention relates generally to a process for flaring a dilute gaseous waste stream not capable of self-sustaining combustion. More particularly, as recited in amended independent Claim 15, the process of the present invention comprises the step of blending the dilute gaseous waste stream with a hydrogen-containing gas stream to produce a flare gas blend, feeding the flare gas blend to a flare, and converting at least 80% of the dilute gaseous waste stream to carbon dioxide and water by combusting the flare gas blend using the flare. As discussed in the present specification, where gaseous waste streams are not

capable of self-sustaining combustion when flared, the U.S. Environmental Protection Agency (hereinafter "EPA") regulations require that hydrocarbon-containing enrichment fuel must be added to the gaseous waste stream prior to flaring to ensure the thorough (i.e., 98%) destruction of the waste stream. As a practical matter, the process of the present invention enables the substitution of a hydrogen-containing gas for the hydrocarbon-containing enrichment fuel, without loss of destruction efficiency. As also discussed in the present specification, practicing the process of the present invention, as recited in amended independent Claim 15, results in lower costs by substituting cheaper hydrogen for hydrocarbon fuel and produces lowered CO, SO_x and NO_x emissions from the flare.

It is respectfully submitted that the prior art reference cited by the Examiner in the Office Action (i.e., "Hydrogen-Fueled Flares"), whether taken alone or in combination with the secondary references cited by the Examiner (i.e., Vickery and Milfeld et al.), does not make obvious the process of the present invention as recited in amended independent Claim 15.

More particularly, "Hydrogen-Fueled Flares" teaches the flaring of a gas stream which contains hydrogen and volatile organic compounds and/or volatile hazardous air pollutants, using a flare to convert at least 98% of the gas stream to carbon dioxide and water. The purpose, however, of "Hydrogen-Fueled Flares" was to demonstrate and prove to the U.S. Environmental Protection Agency (hereinafter, "EPA") that the aforesaid gas stream was capable of self-sustaining combustion when flared and that the flaring of this stream should, therefore, be exempted from the EPA regulations which would otherwise require addition of a gaseous hydrocarbon-containing enrichment fuel. Under the EPA regulations addition of a gaseous hydrocarbon-containing enrichment fuel to such a stream was required to bring the heat content of the fuel and gas stream mixture to at least 200 Btu/scf to ensure the thorough destruction (i.e., at least 98%) of the gas stream when flared. See sections 1.0 Introduction and 2.1 Existing Flare Requirements, pages 1-2, and section 2.2 Organically-Fueled Flare Studies . . . , page 5, of "Hydrogen-Fueled Flares". Based upon the disclosures of "Hydrogen-Fueled Flares", the EPA did indeed provide an exception to its regulations applicable to flaring gas streams whereby new specifications

were established for "hydrogen-fueled" flares that did not require addition of hydrocarbon-containing enrichment fuel as long as the gas stream to be flared contains at least 8 vol% hydrogen, along with other apparatus and operational requirements (see section 5.3 Selection of the Specifications . . . ", bottom of page 24, of "Hydrogen-Fueled Flares").

"Hydrogen-Fueled Flares" does not concern the flaring of gas streams which are not capable of self-sustaining combustion, which remain subject to the EPA regulations discussed therein. On the other hand, the present invention, as recited in amended independent Claim 15, relates to a process for flaring a dilute gaseous waste not capable of self-sustaining combustion. Furthermore, "Hydrogen-Fueled Flares" does not teach or suggest the blending of a dilute gaseous waste stream with a hydrogen-containing gas stream to obtain a flare gas blend having at least 3 vol% hydrogen, as in the present invention recited in amended independent Claim 15.

Since "Hydrogen-Fueled Flares" concerns the flaring of a gas stream capable of self-sustaining combustion, there is no motivation based on this disclosure to modify the process disclosed therein to include a the step of blending the gas stream described therein (which already contains hydrogen) with a hydrogen-containing gas stream. Moreover, in view of the cost and environmental benefits realized by practicing the present invention, the fact that five years have passed since publication of "Hydrogen-Fueled Flares" without others, including the EPA, developing a new process, regulations or recommendations to blend hydrogen, instead of hydrocarbon fuels, with dilute gaseous waste streams that are otherwise not capable of self-sustaining combustion when flared, demonstrates that the disclosures of "Hydrogen-Fueled Flares" did not make the process of the present invention obvious.

With respect to the secondary references cited by the Examiner, i.e., Vickery and Milfeld et al., neither of these references relate to the same field as "Hydrogen-Fueled Flares", i.e., the destruction of gaseous streams containing contaminants using flares. Rather, Vickery and Milfeld et al. both relate to high temperature incineration of waste streams in incineration apparatus which necessarily include an enclosed combustion chamber, closed to the ambient atmosphere and capable of operating a elevated temperatures and pressures to ensure destruction of the waste streams. It is

respectfully noted that the aforesaid configuration and operation of incinerators is very different from that of flares, which combust gas streams at the opening of the flare pipe – i.e., open and in contact with the ambient atmosphere. In fact, the EPA has entirely different sets of regulations to control the operation of flares and incinerators (see, for example, 40 CFR § 60.18 [flares] and 40 CFR § 60.50-60.54 [incinerators]). Thus, there would be no motivation, based upon general knowledge in the art of flaring, for persons having ordinary skill in the art to modify the teachings of “Hydrogen-Fueled Flares”, which applies to flares, with the disclosures of Vickery or Milfeld et al., which apply to incinerators, to develop the process of the present invention according to amended independent Claim 15, which applies to flares. IN other words, Applicatnts respectfully submit that there is no reason why a person of ordinary skill working in the field of flaring dilute gaseous waste streams would look to documents discussing incinerators for guidance as to how to blend gas streams for feeding to a flare.

In the foregoing circumstances, it is respectfully submitted that the present invention as recited in amended independent Claim 15 is not made obvious in view of “Hydrogen-Fueled Flares”, whether taken alone or combined with either Vickery or Milfeld et al. Thus, it is believed that amended independent Claim 15, as well as amended Claims 16-18 and new Claims 20-23, which depend directly or indirectly from Claim 15, are patentable over “Hydrogen-Fueled Flares”, Vickery and Milfeld et al.

Conclusion

Applicants and their attorney hereby respectfully request re-examination and allowance of Claims 15-18 and 20-23. If, however, there remain any open issues which the Examiner believes can be resolved by a telephone call, the Examiner is cordially invited to contact the undersigned attorney.

This Amendment is being submitted along with a Request for Continued Examination (RCE) and a Petition for Extension of Time. The fees to cover the RCE and the extension of time are to be charged to Deposit Account 18-1850 according to the authorizations contained in the accompanying RCE and Fee Transmittal forms. No additional fees are believed to be due in connection with the submission of this Amendment. However, if any fees, including petition and extension fees, are due in

connection with the submission of this Amendment, the Commissioner is hereby authorized to charge them, as well to credit any overpayments, to Deposit Account No. 18-1850.

Date: **August 22, 2003**
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Respectfully submitted,



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